Tierra Responses to Comments on Newark Bay Study Area
SQT and Porewater Data Report (Tierra Solutions, Inc., July 2016)
March 16, 2017

Comment No.	Section	Page	Comment	Tierra Response
1	Figures	New Figure Request	Please add a figure that shows the shoreline types (as presented in Figure 4-1 "Shoreline Land / Human Use Characterization" of the Reconnaissance Survey Report, dated April 2015) along with 2014 clam-sediment, Sediment Quality Triad (SQT) sediment, and 2015 Baseline Human Health Risk Assessment (BHHRA) sediment sampling locations (collected during the SQT program).	Figure 2-1 will be updated to show the shoreline types as presented in Figure 4-1 "Shoreline Land / Human Use Characterization" of the Reconnaissance Survey Report, dated April 2015, along with 2014 clam-sediment, Sediment Quality Triad (SQT) sediment, and 2015 Baseline Human Health Risk Assessment (BHHRA) sediment sampling locations.
2	Section 2.0 Sampling Design	Page 1 of 5 (PDF page 9)	Section 2.0 states that deviations from the SQT Quality Assurance Project Plan (QAPP) are described in Section 2.4; however, there is no Section 2.4 provided in the report. Please revise the text or insert a cross-reference to the SQT Field Report.	Section 2.0 will be revised as follows: "This section summarizes the sampling design and methodology used during the September 2015 SQT and porewater sampling program. Detailed descriptions of the sampling design and methodology are presented in the SQT QAPP (Tierra 2015). Section 2.1 identifies the locations sampled during the SQT and porewater sampling program. Methods used to collect and process the samples are summarized in Sections 2.2 and 2.3, respectively~~, and deviations from the SQT QAPP are described in Section 2.4~~. The NBSA

Comment No.	Section	Page	Comment	Tierra Response
				Sediment Quality Triad and Porewater Field Report ([SQT Field Report]; Tierra 2016) contains complete documentation of field activities, including deviations from the SQT QAPP."
3	Section 2.3.2 Bioaccumulation Study	Page 2 of 5 (PDF page 10)	Section 2.3.2 should state whether the worms were depurated or not, and, if so, for how long before preparing for shipment to the analytical laboratory. The ASTM (2010) guidance (E-1688) referenced in the QAPP (Tierra, 2015) recommends not depurating organisms if the data are to be used to estimate exposures to benthivores and higher trophic levels; however, depuration would be appropriate for deriving sediment to worm tissue uptake factors. A Baseline Ecological Risk Assessment (BERA) typically considers incidental sediment ingestion as a separate pathway when quantifying contaminant exposures, obviating the concern about using depurated tissue samples.	The following sentence will be added before the second to last sentence in Section 2.3.2: "After 28 days of exposure, the organisms were recovered from the test chambers and placed into clean artificial sea water for 24 hours to purge their digestive tracts." Additionally, the second to last sentence in Section 2.3.2 will be revised as follows: "~~At the end of the 28-day exposure period, t~~Tissue samples of the polychaete worms were then prepared and submitted for analytical chemistry analysis."
4	Section 2.3.3.1 Hydrophobic Organic Compounds	Page 3 of 5 (PDF page 11) Top paragraph on page	Performance reference compounds were only added to PCB and PAH passive samplers to correct porewater concentrations for equilibrium conditions. The PCDD/F and pesticides values are potentially biased low since they were	The second sentence of the first paragraph in Section 2.3.3.1 will be updated as follows:

Comment No.	Section	Page	Comment	Tierra Response
			not impregnated. Please revise the following sentence in Section 2.3.3.1: "…each passive sampler was cleaned and impregnated with a set of performance reference compounds that allow the assessment of the extent of equilibrium achieved during the contact period."	"Before contact with the sediment slurry, each passive sampler was cleaned. Passive samplers for analysis of PCB congeners and SVOC SIM were ~~and~~ impregnated with a set of performance reference compounds that allow the assessment of the extent of equilibrium achieved during the contact period."
5	Section 3.5.2 Benthic Index of Biotic Integrity (B-IBI)	Page 6 of 6 (PDF page 19) Last paragraph on page	It is premature to offer conclusions regarding the B-IBI scoring results until Phase III sampling results are available and biological metrics have been evaluated from the perspective of the more relevant stratification approach. Consequently, please remove the conclusion that the NBSA is "non-impacted" and rather specify that B-IBI scores will be evaluated further once the Phase III surface sediment sampling results are available.	The last paragraph of Section 3.5.2 will be revised as follows: "B-IBI scores for the NBSA ranged from 1.8 to 4.2, with an overall average of 3.1. ~~Based on this overall score, the NBSA is considered (per the specifications of Weisberg et al. 1998) to be non-impacted.~~ A summary of the B-IBI scores for each station and geographic region is presented in Table 3-22 and on Figure 3-33. B-IBI scores will be evaluated further once the Phase III surface sediment sampling results are available."
6	Table 2-1	PDF page 23	Please refer to the comment on Table 2 of the SQT Field Report. Surface water was not a targeted sample matrix (i.e., surface water field samples were not collected for lab	Consistent with the SQT Field Report, the following footnote will be added to Table 2-1:

Comment No.	Section	Page	Comment	Tierra Response
			analysis). Instead surface water was collected and used in the field facility for the shipment of passive samplers (so they would not dry out). Please remove surface water from Table 2-1 or add a footnote stating that the SQT program did not include collection of surface water field samples.	"[3]Surface water was not a targeted sampling matrix. Surface water was collected and used in the field facility for the shipment of sediment for porewater chemistry analyses." The legend on Figure 2-1 will be revised as follows: "Surface Water ~~Sampling~~Collection Location" The following note will be added to Figure 2-1: "6. SURFACE WATER WAS NOT A TARGETED SAMPLING MATRIX. SURFACE WATER WAS COLLECTED AND USED IN THE FIELD FACILITY FOR THE SHIPMENT OF SEDIMENT FOR POREWATER ANALYSES."
6	Table 3-18	PDF pgs. 135-136	Benthic Community Metric values in Table 3-18 should be checked for accuracy. Calculation errors were detected for Pielou's Evenness (e.g., Locations 158 and 155) and Swartz's Dominance (e.g., Locations 145 and 152). In addition, minor rounding errors in approximately 25-30 percent of the Total Mean Density values presented in Appendix C were observed. Please check calculations, review rules for	For Table 3-18, calculations will be checked and rules for significant figures will be reviewed. The following footnotes will be added to Table 3-18 to describe the procedures used to calculate the benthic community metrics shown on the table:

Comment No.	Section	Page	Comment	Tierra Response
			significant figures, and explain procedures in table footnotes.	"[1] Total Taxa (Richness) is the total number of species represented in a sample. The values are prepared by counting the number of distinct species in a given sample. [2] Total Mean Density is the number of individual organisms found per sample area. The values are prepared by counting the number of distinct individual organisms in a given sample. [3] Shannon Wiener Diversity Index is a measure of the species diversity of a sample and takes into account species richness and evenness of each species within the community. The formula for calculating the Shannon Wiener Diversity Index is provided in Section 3.5.1.2. [4] Pielou's Evenness is related to the Shannon-Wiener diversity index in that it also examines the distribution of individuals among taxa relative to an idealized distribution. The formula for calculating Pielou's Evenness is provided in Section 3.5.1.3.

Comment No.	Section	Page	Comment	Tierra Response
				[5] Swartz's Dominance is an indicator of whether a small number of taxa dominate the sample. The formula for calculating Swartz's Dominance is provided in Section 3.5.1.4."
7	Figure 2-1	PDF page 149	Please refer to the comment on Figure 3 of the SQT Field Report. Similar to SQT QAPP Figure 1, please uniquely identify the sampling locations on Figure 2-1 to denote the different suites of analyses planned for the collected samples (e.g., sediment for chemical analysis only was collected from the BHHRA locations).	Figure 2-1 will be updated to identify the different suites of analyses conducted on the collected samples.
8	Figures 3-30 and 3-31	PDF pgs. 179-180	It appears that Figure 3-30 and Figure 3-31 present similar information (i.e., Figure 3-30 shows dominant primary taxonomic group for the entire bay, while Figure 3-31 shows the data by geographical zone). If this observation is correct, please use a similar format for the two graphics and the same legend and color-coding per taxonomic group. For example, a fourth bar could be added to Figure 3-31 for "All Zones Combined."	Figure 3-30 will be replaced with Figure 3-31 and will be updated to include a fourth bar for "All Zones Combined." Figure numbers will be updated accordingly.
9	Appendix B	General comment: All contaminants (PCDD/F, PCB, PAH, and Pesticides)	Once porewater calculations are finalized, please add final porewater concentrations to the compiled electronic database as a calculated value, and consider marking the current extract concentrations as "not reportable" with a comment that the final calculated porewater concentrations supersede the extract concentrations.	Once porewater calculations are finalized they will be added to the Tierra Analytical database as a calculated value. The current extract concentrations will be marked "not reportable" and will include a comment that the final calculated porewater concentrations supersede the extract concentrations.

Comment No.	Section	Page	Comment	Tierra Response
10	Appendix B	General comment: All contaminants (PCDD/F, PCB, PAH, and Pesticides)	Please clarify whether the Log K_{PE-w} values were corrected for temperature and/or salinity (as appropriate). Log K_{PE-w} values from the literature assume freshwater conditions and an ambient temperature of 25 degrees Celsius.	The Log K_{PE-w} values were not corrected for temperature or salinity. The temperature in the lab is maintained at approximately 25°C. Even for a temperature as high as 30°C, the difference in K_{PE-w} values is less than a factor of 1.2 (Lohmann 2012). Based on site-specific salinity data and calculations performed based on the correlation provided in Lohmann (2012), the change in K_{PE-w} values based on salinity would be negligible (less than 1%).
11	Appendix B PAH Spreadsheet	General comment on PAH calculations	Please clarify what compounds are included in "C1-naphthalenes" other than those reported for 1-methyl-naphthalene and 2-methyl-naphthalene.	For clarification, the PAH spreadsheet was not included in the SQT Data Report but provided to USEPA separately on July 11, 2016. Per the analytical laboratory, only 1-methyl-naphthalene and 2-methyl-naphthalene are included in "C1-Naphthalenes." The following note will be added to Tables E-1, E-2, and E-3 of Appendix E: "12. C1-Naphthalenes = sum of 1-methyl-naphthalene and 2-methyl-naphthalene"

Comment No.	Section	Page	Comment	Tierra Response
12	Appendix B PCB spreadsheet	General comment on PCB calculations	a. For several co-eluting PCB congeners, fewer K_{ow} values are listed than there are co-eluting PCB congeners reported. Please review and revise (as appropriate), or provide rationale for the discrepancy. b. There appears to be a major discrepancy in the Log K_{PE-w} values reported by Fernandez et. al. (2014) for PCB congeners and the values used by Tierra/UMBC. Please review and revise (as appropriate), or provide rationale for discrepancy. It is recommended that Tierra/UMBC refer to values provided by Lohmann (2012) and correlations provided therein.	For clarification, the PCB spreadsheet was not included in the SQT Data Report but provided to USEPA separately on July 11, 2016. a. Single values were reported for the co-eluting congeners with the same K_{ow}. K_{ow} values will be added for all the congeners. b. As mentioned in the approved SOP for porewater organics, the correlation provided by Ghosh et al. (2014) was used to calculate the K_{PE-w} for PCBs. The Ghosh et al. (2014) document came out of a SETAC Pellston workshop where 40 researchers in the field of passive sampling came together to develop consensus recommendations.
13	Appendix B Pesticide spreadsheet	General comment on Pesticide calculations	Tierra/UMBC used a linear Log K_{ow}- Log K_{PE-w} correlation for pesticides, even though there is strong evidence that this correlation may not be appropriate for such a diverse set of compounds. Please refer to Lohmann (2012) for better correlations with aqueous solubility at saturation.	For clarification, the Pesticide spreadsheet was not included in the SQT Data Report but provided to USEPA separately on July 11, 2016. The linear correlation used for pesticides was reported by Fernandez et al. (2014). The

Comment No.	Section	Page	Comment	Tierra Response
				procedure provided in the approved SOP was followed.
14	Appendix B: Pesticide spreadsheet	General comment on Pesticide calculations	Please consider reporting pesticide concentrations in ng/mL to be consistent with results for the other compounds.	Pesticide concentrations will be reported in ng/mL.
15	Appendix B: PCDD/F and PCB Spreadsheet and UMBC Memo	UMBC Memo, first to last sentence of second paragraph (PDF Page 578)	The Tierra/UMBC memorandum states: "PE passive samplers loaded with performance reference compounds (PRCs) were used to determine the freely dissolved porewater concentrations of PCBs, PAHs, and pesticides." It does not appear that equilibrium corrections were considered for the pesticide compounds, even though several pesticides share a molecular weight similar to hexa-PCB or hepta-PCB congeners. Please consider correcting pesticide porewater concentrations for equilibrium, similar to the PCB calculations.	For clarification, the PCDD/F spreadsheet was not included in the SQT Data Report but provided to USEPA separately on July 11, 2016. As mentioned in Appendix B, for pesticides, fractional equilibrium of individual compounds was calculated based on the loss of PCB PRCs. The pesticides fractional uptake (based on K_{ow}) for all samples was predicted to be greater than 80%. As specified in the approved QAPP/SOP (Ghosh 2015), no PRC corrections were performed for the porewater concentrations of pesticides because greater than 80% of equilibrium was achieved.
16	Appendix B: PCDD/F and PCB Spreadsheet and UMBC Memo	UMBC Memo, last sentence of second paragraph (PDF Page 578)	The Tierra/UMBC memorandum states: "POM passive samplers (without PRCs) were used to measure freely dissolved concentrations of dioxins and furans." Please add a comment that PCDD/F porewater concentrations are potentially biased low, since they were derived from the	The addition of the suggested comment would not be correct. The potential disequilibrium of POM also exists in the reported values of K_{POM} as these are for well-

Comment No.	Section	Page	Comment	Tierra Response
			POM passive sampler that was not impregnated with PRCs to assess equilibrium.	mixed laboratory mesocosms not static in-situ deployments.
17	Appendix B: PCDD/F and PCB Spreadsheet and UMBC Memo	UMBC Memo, Item 1, first sentence (PDF page 578)	There appears to be an inconsistency between Tierra's reported concentrations based on a final extract volume of 20 uL for PCDD/F, and UMBC's calculations that assume a final volume of 1 mL. According to Tierra's electronic database, the PCB and PCDD/F final extract volumes were 20 uL; only PAHs had a final extract volume of 1 mL. Please clarify or correct and revise as appropriate.	The values provided in Tierra's electronic database are correct. The porewater calculations will be revised to use final extract volumes of 20 uL for PCBs and PCDDs/Fs and 1 mL for PAHs.
18	Appendix B: PCB spreadsheet and UMBC Memo	UMBC Memo, Item 2 (PDF page 579)	PRCs were included and dissipated in all but eight sediment samples to more than 80% of their original concentration. For the eight sediment samples where the PRCs had less than 80% loss from the passive sampler media, a PRC correction was performed according to SOP L40; however, it appears that the equilibrium correction was applied to all PCB congeners in these eight samples, including congeners that were greater than 80% equilibrated. Please revise calculation accordingly (or provide rationale for the inconsistency).	F_{eq} (fraction to equilibrium) of the PCB congeners, for which the corresponding PRC loss was more than 80%, is equal to 1 (F_{eq} values are indicated in the columns next to the PRC corrected values). That means equilibrium concentration is the same as the concentration detected in the passive sampler for those congeners and no PRC correction was performed.
19	Appendix B: PAH Spreadsheet and UMBC Memo	UMBC Memo, Item 2, last paragraph (PDF page 579)	The Tierra/UMBC memorandum states (in Item 2, last paragraph) that the PAH PRCs were not detected above the laboratory reporting limit (RL). The paragraph continues to read that if the laboratory detection limit (DL) value is used to calculate the PRC loss, the losses are less than 80%, which does not provide information necessary for the PRC correction. Please clarify this apparently contradictory statement. Were the RL and DL so elevated that assuming a PRC concentration equal to these values still did not equate to an 80% or more PRC dissipation? Why not use the RL to	The term "detection limit" was used instead of "reporting limit" in error in the referenced sentence. The second sentence in Item 2 will be revised as follows: "If the <u>reporting limit</u>~~detection limit~~ value is used to calculate the PRC loss, the losses are less than 80%, which does not provide the

<table>
<tr><th>Comment No.</th><th>Section</th><th>Page</th><th>Comment</th><th>Tierra Response</th></tr>
<tr><td></td><td></td><td></td><td>assess percent loss rather than the DL? Is there a typo in the statements in the text?</td><td>information necessary for the PRC correction.”</td></tr>
<tr><td>20</td><td>Appendix B: PCB spreadsheet and UMBC Memo</td><td>UMBC Memo, Item 2, third paragraph (PDF page 579)</td><td>Below are examples of some discrepancies observed between the Log K_{PE-w} values calculated based on Log K_{ow} and the Log K_{PE-w} values reported in the Tierra/UMBC spreadsheet. Since the spreadsheet does not contain formulas to describe how the values were derived, please confirm the accuracy of the Log K_{PE-w} values. It is possible that the discrepancy is associated with the averaging of the K_{PE} values for co-eluting PCB congeners (as stated in the memorandum on Page 2, Item 2, Third Paragraph). Examples include:
<table>
<tr><th>Congener</th><th>Log K_{ow}</th><th>Log K_{PE-w} based on correlation 1.18*Log K_{ow}-1.26</th><th>Reported Log K_{PE-w} in Spread-sheet</th></tr>
<tr><td>Co-elute: Hexachlorobiphenyls ; 2,2',3,3',5,6'-(PCB 135)/ 2,2',3,5,5',6-(PCB 151)</td><td>6.64</td><td>6.58</td><td>6.08</td></tr>
<tr><td>Hexachlorobiphenyl; 2,2',3,3',4,5'- (PCB 130)</td><td>6.80</td><td>6.76</td><td>6.50</td></tr>
<tr><td>Hexachlorobiphenyl; 2,2',3,3',4,6'- (PCB 132)</td><td>6.58</td><td>6.50</td><td>6.83</td></tr>
<tr><td>Hexachlorobiphenyl; 2,2',3,3',5,5'- (PCB 133)</td><td>6.86</td><td>6.83</td><td>6.47</td></tr>
</table></td><td>As indicated in the response to comment 12(b), the correlation provided by Ghosh et al. (2014) was used to estimate K_{PE-w} for PCBs. The correlation is: 1.18*log K_{ow}-1.26. This equation will be provided in the revised spreadsheet. Also, log K_{ow} for co-eluting congeners will be provided in separate columns. For PCB congeners that were co-eluting, the average K_{PE-w} values were used.</td></tr>
</table>

Comment No.	Section	Page	Comment	Tierra Response
			Hexachlorobiphenyl; 2,2',3,3',5,6- (PCB 134) 6.55 6.47 6.58 PCB183+185 7.11/ 7.2 7.18 7.24 Co-elute: Heptachlorobiphenyls; 2,2',3,4,4',5,5'- (PCB 180)/ 2,3,3',4',5,5',6-(PCB 193) 7.36/ 7.52 7.52 6.68	
21	Appendix B: PCDD/F and PCB Spreadsheet and UMBC Memo	UMBC Memo, Item 3 (PDF page 580)	Porewater calculations use K_{POM-w} values as published by Cornelissen et. al. (2008); however, two transcription errors were observed for OCDF and 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin. Please correct and revise calculations accordingly (or provide rationale to clarify why a different K_{POM-w} value was applied).	The K_{POM-w} will be corrected for OCDF and 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin.
22	Appendix B: PCDD/F and PCB Spreadsheet and UMBC Memo	UMBC Memo, Item 3 (PDF page 580)	Porewater calculations use K_{PE-w} values as published by Fernandez et. al. (2014); however, two transcription errors were observed for 2,4-DDE and 4,4-DDT. Please correct and revise calculations accordingly (or provide rationale to clarify why a different K_{PE-w} value was applied).	The K_{PE-w} values will be corrected for 2,4-DDE (o,p'-DDE) and 4,4-DDE (p,p'-DDE). The value for 4,4-DDT (p,p'-DDT) is reported correctly.
23	Appendix B: PAH Spreadsheet and UMBC Memo	UMBC Memo, Item 3 (PDF page 580)	Calculations use K_{PE-w} values as published by Ghosh et. al. (2014) for parent PAH compounds and a correlation by Choi et. al. (2013) for alkylated PAHs. Please note the following discrepancies with these references: 1. For many alkylated PAHs (e.g., C2, C3, C4-naphthalenes, C1-fluorenes, and C2-chrysene) the log K_{ow} values do not match the values reported by Choi using the same software, and the derived log K_{PE-w} values do not match the values measured by Choi. In some cases, the log K_{ow} values used seem to be the mean values of those reported by Choi, in other cases not. Please provide a	1. The log K_{ow} of all the congeners in C1-NAPHTHALENES, C1-FLUORANTHENES/PYRENES, C2-NAPHTHALENES, C2-PHENANTHRENE/ANTHRACENE, C3-NAPHTHALENES, C4-NAPHTHALENES groups are provided in Choi et al. (2013) (Supporting Information Table 2). The log K_{ow} for the

Comment No.	Section	Page	Comment	Tierra Response
			better rationale and explanation on how the log K_{ow} values were derived for alkylated PAHs (i.e., if they were averaged), and why the derived values differ from those measured and reported by Choi for the same alkylated compounds. 2. Calculations for alkylated PAH compounds use correlations published in Ghosh et. al. (2014); however, in the spreadsheets provided, no correlation of Log K_{PE-w}-Log K_{ow} is used (instead values are just entered). Please provide correlation calculations.	mentioned groups, were estimated by averaging the reported log K_{ow} values of the congeners associated with each group. For the rest of the alkylated groups, the log K_{ow} of the most available congener associated with the group was used. Log K_{ow} values were obtained from EPI software. As shown in Choi et al. (2013) (Supporting Information, Table 2), the log K_{ow} for the congeners under each alkylated group are not very different. The name of the congener for each log K_{ow} is mentioned as a comment on the cell. Log K_{ow} values for C3-fluorene, C3-chrysene, and C3-fluoranthene/pyrene were provided from different sources (as indicated in the spreadsheet), since they were not available in the software. For alkylated PAHs, K_{PE-w} was estimated based on the correlation between log K_{PE-w} and log K_{ow} provided by Choi et al. (2013). This correlation was shown in Figure 3 (c) in the paper.

Comment No.	Section	Page	Comment	Tierra Response
				2. The correlation will be provided for Log K_{PE-W} of the parent PAHs.
24	Appendix B: Pesticide spreadsheet and UMBC Memo	UMBC Memo, Item 3 (PDF page 580)	According to the Tierra/UMBC memorandum (Item 3), the K_{PE-W} references are from either Ghosh et. al. (2014) for PCBs and parent PAH, Fernandez et. al. (2014) for DDT compounds, or correlations by Fernandez et. al. (2014) for other compounds. Fernandez et. al. (2014) only reports K_{PE-W} for DDTs and PCBs, and gives no correlations for other pesticides (particularly oxychlordane). Please clarify the source of the K_{PE-W} values. [It was observed that the memorandum also references Fernandez et. al. (2009) in the "Literature Cited" – did the text intend to cite a different reference?]	Fernandez et al. (2014) is referencing a previous paper (Fernandez et. al. (2009)) for K_{PE-W} values of the pesticide. The correlation provided in Fernandez et. al. (2009) was used for pesticides. No changes are necessary to the memo.
25	Appendix B: Pesticide spreadsheet and UMBC Memo	UMBC Memo, Item 4, first sentence and Figure (PDF pgs. 581-582)	a. Pesticide blank concentrations are only given as "totals," which are not useful for assessing which compounds might have associated blank contamination. Please coordinate with the laboratory to obtain and report blank concentrations for individual pesticide compounds. b. Please provide a legend and notes for the "Total Pesticides" figure to clarify its purpose (apparently to show that total pesticide contamination in blank samples was negligible compared to detected total pesticide concentrations).	a. Concentrations of individual pesticide compounds will be reported for the blanks. b. The following note will be added to clarify the purpose of the figure: "The total concentration of pesticides in field blanks was negligible compared to the total concentration in sediment samples (2-3 orders of magnitude smaller)."

Comment No.	Section	Page	Comment	Tierra Response
26	Appendix C Normandeau Memo	Quality Assurance/Quality Control (PDF page 587)	The 19 January 2016 memo states that "The results were considered sufficient if 90.0 percent or more of both the taxa and specimens were removed during the initial effort." Samples 144B and 157C were below this criterion. Were these two samples re-counted? It is not clear from the memorandum whether any corrective action was implemented – please clarify.	Because sorting efficiency for samples 144B and 157C fell below 90 percent for either taxa or specimen removal, a second sample processed by the same technician was selected for QA/QC analysis. These results were above 90 percent. For corrective action, the specimens obtained in the QA/QC process for samples 144B and 157C were added to those originally removed from the samples. The macroinvertebrate data reported for these two samples reflect this corrective action. The second paragraph under "Quality Assurance/Quality Control" on page 2 of the Case Narrative (19 January 2016 memo) will be revised to include the above explanation as follows: "Because sorting efficiency for two of the ~~QC~~above samples (144 B and 157 C) fell below 90 percent for either taxa or specimen removal, a second sample processed by the same technician was selected for QA/QC analysis. These~~Those~~ results were above 90 percent~~, so~~

Comment No.	Section	Page	Comment	Tierra Response
				~~no further corrective action was applied~~. For corrective action, the specimens obtained in the QA/QC process for samples 144 B and 157 C were added to those originally removed from the samples. The macroinvertebrate data reported for these two samples reflect this corrective action."
27	Appendix D Normandeau Memo	Analysis and Quality Control, Item A (PDF page 630)	Section A of the 28 June 2016 memo states that drying was confirmed by a 5 percent or less difference between Dry Weight No. 1 and Dry Weight No. 2. Please confirm that the table on PDF page 630 (Hardcopy page 2) represents the minimum and maximum percent difference measured for the entire program. If so, please provide the number of measurements (or sample size) that the summary table represents.	Yes, the two numbers in the table represent the minimum and maximum percent difference measured for the entire program. There were 26 individual measurements, all falling within 0.00-1.49% difference. The last sentence of the third paragraph of Item A under "Analysis and Quality Control" of the Case Narrative (28 June 2016 memo) will be updated as follows: "All samples (26 samples) checked at the Wt2 check point confirmed adequate dryness."
28	Appendix D Normandeau Memo	Analysis and Quality Control, Item B (PDF page 631)	Section B of the 28 June 2016 memo states that the acceptance criteria for the blank tray was 0.0009 grams. Please identify the source of this criterion.	The precision criterion stipulated in Standard Methods for the Examination of Water and Wastewater (pg. 92-93) of "a

Comment No.	Section	Page	Comment	Tierra Response
				difference of less than 5% or less than 0.004 grams" is the guideline followed when conducting checks between initial and final sample weights and blank tray weights. However, it is modified to a more stringent less than 5% or less than 0.001 grams. Blank tray analysis is performed to ensure that there is no additional source of contamination to the process. A more stringent acceptable difference of 0.0009 grams between initial and final blank weights is used by Normandeau. This criterion represents the mean plus two standard deviations of observed differences in previous projects in Normandeau's laboratory. The results were compared against their more stringent laboratory precision criteria. References to the basis for these in-house criteria will be added to Sections A and B in the revised Case Narrative (28 June 2016 memo).
29	Appendix E	General Comment	Please define all qualifiers presented in Appendix E.	A new page will be added to the beginning of Appendix E that

Comment No.	Section	Page	Comment	Tierra Response
				presents qualifier definitions for all included tables.
30	Appendix E, Table E-3, "Metals in Porewater"	PDF page 767	Please explain why metals in porewater are marked "NA" (not analyzed) in Table E-3 "Porewater Analytical Results" for Location NB03SED-POR155. There is no discussion of metals completeness in Appendix H; in fact, porewater analytical completeness for metals is marked 100 percent on PDF page 801 in Appendix H.	While removing the dialysis bags from the sediment in the 5-gallon bucket in the laboratory for Location 155, one of the dialysis bags broke and the contents were lost. As such, there was not enough sample volume in the remaining dialysis bag to run all of the inorganics analyses. It was decided that samples would only be sent for analysis of total sulfide, mercury, and methylmercury for this sample. Table E-3 shows "NA" for the analyses that were not conducted on this sample. Appendix H will be updated to include metals completeness information as described above.
31	Appendix F and Appendix G	General Comment on Appendix F and Appendix G	Please confirm completeness of Appendix F "Laboratory Data Reports" and Appendix G "Data Verification/Validation Reports" since these appendices were placeholders (no content) in the July 29, 2016 (Revision 0) deliverable of the SQT Data Report.	Appendix F "Laboratory Data Reports" and Appendix G "Data Verification/Validation Reports" will be provided with the final version of the report and they will be checked for completeness prior to submission.
32	Appendix H	General Comment	Please discuss "Percent Lipid" and "Percent Moisture" data verification in Appendix H (per SQT QAPP Worksheet 36).	The following text will be added to Section 3.1.2 of Appendix H:

Comment No.	Section	Page	Comment	Tierra Response
				"**Percent Lipid** The SQT tissue percent lipid dataset is comprised of 9 samples with 9 associated results. No major or minor data quality issues were identified during the verification of the SQT percent lipid analyses. **Percent Moisture** The SQT sediment percent moisture size dataset is comprised of 46 samples with 46 associated results and tissue percent moisture dataset is comprised of 9 samples with 9 associated results. No major or minor data quality issues were identified during the verification of the SQT percent moisture analyses."
33	Appendix H	General Comment for Sections 2.0, 3.0, and 4.0	The tables in Section 3.0 summarize the reasons that data were qualified for non-compliance with regard to precision, accuracy/bias contamination, overall accuracy/bias, and representativeness. It is unclear which of the major and/or minor data quality issues resulted in sensitivity issues (as discussed in Section 2.4) and more importantly, what major	Information will be added to each section to clearly identify the major and minor data quality issues. The text will identify any rejected results in the applicable sections.

Comment No.	Section	Page	Comment	Tierra Response
			and/or minor data quality issues resulted in rejected data (as discussed in Section 2.7). Please provide further discussion to summarize the underlying causes of sensitivity concerns and rejected data. The reviewer noticed that a discussion of rejected data was included in the conclusions (Section 4.0); this information should also be provided in the appropriate locations in Section 3.0.	
34	Appendix H	General Comment on Tables in Section 2.0	(1) To prevent confusion, fill all of the empty cells with a symbol to denote that validation was completed but no data were qualified (instead of a blank cell). (2) Revise the definition for the "x" symbol to include the data indicator. For example, "data qualified due to precision during validation for this analytical group" for the table on PDF page 790. (3) Please confirm the accuracy of the summary tables in Section 2.0 with the information in Section 3.0. For example, PDF page 821 indicates that DOC field blank contamination was present, but the corresponding table in Section 2.0 on is not marked accordingly. Another example is that PDF page 815 indicates that methylmercury data only had a precision-related qualification, but the corresponding tables in Section 2.0 suggest that holding time violations were also an issue for methylmercury analyses.	(1) A 'v' will be added to the tables to replace the blank cells. (2) Definitions for the 'x' symbol will be further defined to include the data indicator. (3) The tables in Section 2.0 will be reviewed and revised if necessary to be consistent with the information in Section 3.0.
35	Appendix H	General Comment on Appendix H Section 3.0	The following comment addresses Pesticides but also applies to other analytical groups. The quality issue described as "Non-compliant project specific surrogate recovery, as specified by USEPA Region 2" is classified as both a major data quality issue on PDF page 807 and a minor data quality issue on PDF page 808. Please explain the difference. (Section 4.0 states that 95 sample results for pesticides were rejected due to surrogate recovery, which matches the number of results listed in the pesticides "major data quality	Information will be added to each section to clearly identify the major and minor data quality issues. The text will identify any rejected results in the applicable sections.

Comment No.	Section	Page	Comment	Tierra Response
			issue" tables on PDF page 807.) The reviewer concluded that a "major data quality issue" resulted in data rejection while a "minor data quality issue" resulted in J-flags. If this assumption is true, then please revise text to be clearer, since there is no discussion of rejected data in Section 3.0.	
36	Appendix H Section 1.0, Introduction	PDF page 787 Second paragraph	When listing the number of samples validated, please add parentheses to separate the field samples from the site-specific quality control samples. For example, the SQT program included 30 porewater samples plus associated field duplicates and media blanks (not 32 porewater samples as presented on page 1 of Appendix H; the extra two samples are site-specific quality control samples).	The first sentence of the second paragraph of Section 1.0 will be revised as follows: "The SQT activities consisted of the collection and analysis of ~~32~~30 porewater samples (plus 2 field duplicates), ~~46~~43 sediment samples (plus 3 field duplicates), and ~~9~~8 tissue samples (plus 1 field duplicate)."
37	Appendix H Section 2.1, Precision	PDF page 788 Second paragraph	1. The discussion on precision and the difference between "co-located samples" and "field duplicate samples" needs to be clarified. For porewater passive samplers, the use of the phrase "co-located samples" is correct because two samplers were deployed into the same chamber. In contrast, sediment field duplicate samples represent two aliquots of material taken from the same composited and homogenized sediment material and shipped 'blind' to the laboratory. 2. For the bioaccumulation worm tissue, please clarify if there was sufficient mass for a separate field duplicate sample or if only a laboratory replicate was performed. According to the SQT QAPP Worksheet 12, only laboratory replicates were required to assess precision of the tissue matrix due to limited mass; however, Table	1. To clarify the difference, the last sentence in the second paragraph of Section 2.1 will be replaced as follows: "For porewater samples, co-located samples were collected as two distinct samples, and submitted "blind" to the analytical laboratories for analysis (i.e., the sample identification did not reveal the sample with which its field duplicate was associated). For sediment samples, two aliquots of

Comment No.	Section	Page	Comment	Tierra Response
			E-2 on PDF page 744 indicates that a field duplicate for bioaccumulation worm tissue was generated.	material were taken from the same composited and homogenized sediment material and shipped "blind" to the laboratory. For tissue samples, the tissue was exposed to the same composited and homogenized sediment material in separate test chambers and then submitted "blind" to the laboratory." 2. There was sufficient mass for a separate field duplicate sample for the bioaccumulation worm tissue. Although the requirement was not included in Worksheet 12-3, a field duplicate was included in Worksheet 20-4. The sample is discussed in the proposed text in response to the first part of this comment.
38	Appendix H Section 2.4, Sensitivity	PDF page 794	Please add a note that the QAPP's PQLs were set equal to the laboratory achievable quantitation limit, and any dilution or adjustment in initial extraction mass (or final extract volume) by the laboratory would cause the quantitation limit to be higher than the achievable quantitation limit.	The following sentence will be added after the second sentence of the first paragraph in Section 2.4: "The QAPP PQLs were set equal to the laboratory achievable quantitation limits, and any

Comment No.	Section	Page	Comment	Tierra Response
				dilution or adjustment in initial extraction mass by the laboratory would cause the quantitation limit to be higher than the achievable quantitation limit."
39	Appendix H Section 2.5, Representativeness	PDF page 796	Representativeness includes an examination of holding time as well as sample handling and storage. Please confirm that the main reason that data were qualified for representativeness is holding time violations, as per the table header on PDF page 796. If this is correct, please add a sentence to Section 2.5 stating that data were qualified due to holding time violations.	The following sentence will be added before the last sentence of the second paragraph in Section 2.5: "Data were qualified for representativeness due to holding time violations."
40	Appendix H Section 2.7, Field and Analytical Completeness	PDF page 798	The overall analytical completeness is 96.4 percent. (1) Please explain how the information in the smaller tables on PDF pages 799-802 yielded an overall analytical completeness of 96.4 percent, and (2) please note specifically if the laboratory completed the analysis but the data were subsequently rejected, causing the overall analytical completeness to be 96.4 percent.	The following text will be added to Section 2.7 regarding analytical completeness: "The total analytical completeness was obtained using the total sample results for porewater, sediment, and tissue minus the total of rejected results. The laboratory completed all analyses but the data was rejected, causing the overall analytical completeness to be 96.4%. The analytical completeness achieved for porewater samples was 99.0%. The analytical completeness achieved for sediment samples was 95.1%. The analytical

Comment No.	Section	Page	Comment	Tierra Response
				completeness achieved for tissue samples was 97.5%. The total analytical completeness for all matrices analyzed is 96.4%."
41	Appendix H Bioaccumulation Testing	PDF page 824	1. Please add a cross-reference to Appendix A in the sub-section "Bioaccumulation Testing." 2. Please add a comment on precision (or refer to discussion in Appendix A); please correct the text to note that the program collected 8 field samples and 1 field duplicate (not 9 field samples).	1. A reference to Appendix A will be added as follows: "For bioaccumulation testing results please refer to the report in Appendix A." 2. Text on page 1 will be revised to include the duplicate samples after the field samples as shown in the response to comment 36. Text in the Bioaccumualation section will be revised as follows: "The SQT tissue data set is comprised of 9 samples (8 samples plus one duplicate sample) with 9 associated results."
42	Appendix I	General Comment	Please add a cover page to Appendix I containing the document source for "Table 6 Thresholds used to score each metric of the NY-NJ Harbor B-IBI."	A cover page will be added to Appendix I documenting the source for "Table 6 Thresholds used to score each metric of the NY-NJ

Comment No.	Section	Page	Comment	Tierra Response
				Harbor B-IBI." The following text will be added to the cover page: "Threshold values for each metric are based on the NY/NJ B-IBI presented in Weisberg et al. (1998)."